sible for the thrombosis (Buerger). Its cause may be microbic. However, the increased viscosity of the blood, viz., blood that is thicker than normal, also seems to play an important role in the etiology of the disease. It is possible that an altered quality of the blood such as also represents a cause for the occurrence of the thrombosis and subsequent gangrene. On the basis of this reasoning, procedures which tend to reduce the coagulability of the blood within the body deserve to be tried in our efforts to find the underlying cause of the trouble. Intravenous injections of anticoagulating substances, as, for instance, of a 2 per cent. watery solution of sodium citrate, may prove to be a useful adjuvant to the systematic hypodermic administration of Ringer's solution.

THERAPEUTICS

UNDER THE CHARGE OF
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The Treatment of Typhoid Fever with Typhoid Vaccine Administered Intravenously.—McWilliams (*Med. Record*, 1915, lxxxviii, 648) has collected a total of more than 550 cases of typhoid fever treated with intravenous injections of typhoid vaccine and reported in the literature by various observers. In more than half of these cases the disease was cut short, the patient having been saved from one to several weeks of fever. McWilliams believes that a few deaths must undoubtedly be attributed directly to the injections of vaccine. However, this is likely to occur with any new and radical method of treatment. As the contra-indications and dosage are better understood, such deaths should become extremely rare. No one type of vaccine seems to possess any great superiority over other types with regard to treatment. The proper dosage for intravenous injections appears to be from 100 to 250 million bacilli. The injection of the vaccine calls forth first a marked leukopenia and several hours later a high-grade leukocytosis in typhoid patients. Variations in the number of polynuclear leukocytes are responsible for these changes, the lymphocytes remaining relatively constant. The eosinophile cells undergo an increase shortly after the injection. The various types of vaccine call forth similar changes in the blood picture.

The Treatment of Typhoid Fever by Stock Typhoid Vaccine.—Wiltshire and MacGillycaddy (*Lancet*, 1915, clxxxix, 685) report a consecutive series of 50 cases of typhoid in which two or more doses of vaccine were given for therapeutic effect. Seven of these patients died, giving a mortality of 14 per cent. Six of the fatal cases were complicated by severe bronchopneumonia, the seventh died from intestinal perforation at a period of the disease when it seemed as if the vaccine had reduced the general typhoid toxemia. The authors divide this series into three groups according to the results of the treatment. In the first group, consisting of six cases, the vaccine did harm. In three of these the harmful effect was due to the doses being given with too short an interval (forty-eight hours) between them. These showed an increase of fever lasting for several days, but all eventually recovered. In the other three cases, bronchopneumonia occurred and seemed to be made worse by the treatment. The second group consisted of 12 cases, who were neither helped nor made worse by the vaccine. In 5 cases of this group the vaccine was given a thorough trial with no apparent effect on the course of the disease. In the remaining 7 the vaccine treatment was discontinued because of ensuing complications. The last group, 32 cases, showed benefit from the treatment. In 24 cases of this group a definite improvement began after the first or second dose and continued until recovery. Five cases showed no improvement until more than two doses had been given. In one case the vaccine was not used until late in the disease, but was followed by marked improvement. The two remaining patients responded well to the initial doses, but later doses seemed to coincide with relapses which ran their course unmodified by the treatment. The authors noted that the patients who responded best to the treatment seemed more prone to relapses, which, however, were not severe. They advise starting the treatment as soon as possible in the disease. They believe that a reasonable suspicion that a patient is suffering from typhoid is sufficient indication for beginning vaccine treatment. The initial dose is 250,000,000 and an interval of three days should elapse between doses. The second dose is 375,000,000, the third is 500,000,000 and following this each dose is increased by 250,000,000. Shorter intervals are not well tolerated, frequently tending to an increase in the symptoms. When a longer interval has elapsed if four days, the dose should not be increased, if over four days, the dose should be reduced. When a reaction was produced by the vaccine which was more than very slight, the same sized dose was either repeated or the dose was reduced. The vaccine treatment should be continued for ten days after the temperature is normal in order to avoid relapse.

The Efficiency of Various Antityphoid Vaccines.—Sawyer (*Jour. Am. Med. Assn.*, 1915, lxv, 1413) says that the literature on antityphoid vaccination gives little information regarding its value under the conditions of ordinary civil life. To obtain information regarding the results of antityphoid vaccination in the civil population of California statistics were collected by Sawyer. He believes that the use of vaccine in civil life is a much more severe test of its value because the vaccine is most used when the exposure is greatest, and because only a small proportion of people in civil life are vaccinated. A total of 8124 persons received prophylactic inoculations and thirteen different vaccines of the several types in common use were employed. In the whole number of vaccinated persons, there were forty-one instances of true failures. All cases reported as typhoid fever and occurring at least thirty days and not more than two and one-half years after the first dose of vaccine were recorded as true failures. Most of the failures were in persons who lived in the same household with typhoid patients who had nursed typhoid patients, or who had been exposed to some heavily polluted common food or water supply. Under such conditions of unusual exposure, the prophylactic use of vaccine seems to give an inadequate protection. Sawyer could determine little difference between the sensitized and unsensitized vaccines in common use as regards severity of reactions and the degree of protection obtained. A polyvalent sensitized vaccine supplied by the State Board of Health seemed to give slightly better protection, but the superiority was not conclusively demonstrated. Sawyer believes that widespread and severe exposures are prevented by better supervision over public water, milk, and food supplies, vaccination can be depended on to diminish greatly the residual typhoid fever, especially if a large enough proportion of the people are vaccinated to reduce contact infection to a minimum.

Therapeutic Typhoid Vaccination.—REITER (*Deutsch. med. Wchnschr.*, 1915, xli, 1120) sums up his experience with typhoid vaccine as a therapeutic measure for typhoid fever. He says that in carefully and individually regulated dosage, typhoid vaccine, in the majority of cases exerts a favorable influence on the course of the disease. The vaccine tends to shorten the disease and lessens the mortality. The temperature is usually at a lower level in cases that react favorably to the treatment. If the temperature is not lowered by the treatment, the chances for benefit from the vaccine are slight. The action of the vaccine on the disease cannot be termed in any way specific. Complications of the disease do not seem to be prevented or benefited to any marked degree. Reiter believes that the results of vaccine treatment on the whole are sufficiently encouraging to add the treatment to the other measures that are usually used. While complications do not seem to be favorably influenced by the treatment, nevertheless they are not considered as contra-indications to the treatment with regard to dosage. Reiter believes that repeated small injections are preferable to single large doses.

The Etiology of Typhus Exanthematicus.—The complete report of the etiologic studies on typhus fever by PLOTZ, OLITSKY and BAEHR (*Jour. Infect. Dis.*, 1915, xvii, No. 1) is taken up in three divisions. *A*. Bacteriologic Studies: A review of the literature and expecially of the cross inoculations of Anderson and Goldberger indicates that the virus of typhus is present in the circulating blood during the febrile period; that it is non-filterable and therefore probably of microscopic size; and that it is probably of bacterial rather than of protozoan nature. Up to the present time, eleven cases of European epidemic typhus and forty cases of the local endemic form (Brill's disease) have been studied. The same organism was grown from seven of the cases of the European epidemic form and from eighteen of the cases of local endemic form. It is necessary to culture the organism anaerobically after the method used by Noguchi for spirochetes or by the method of Liborius and Veillon. The organisms grow only in the deeper parts of the tubes and cultures are not considered negative until after twenty days. The organism grown is a small, pleomorphic Gram-positive bacillus which is non-motile, non-acid fast, not encapsulated, and producing no spores. Negative results are always obtained on aerobic cultivation. Control cases cultured by the same methods gave invariably negative results. *B.* Serologic Studies: The biological reactions found with this organism, the authors feel, offer conclusive proof that Brill's disease (endemic typhus fever) and true epidemic typhus are identical. They have furthermore definitely associated this organism with the etiology of typhus fever. Complement-fixing bodies, agglutinins and precipitins are usually not seen at the height of the disease, but are present at the time of crisis, and increase during the postcritical afebrile stage. They can be demonstrated *in vitro* when the organism isolated from the blood of typhus patients is used as artificial antigen. The occurrence of these immunity reactions to the bacillus in question only in cases of endemic and epidemic typhus fever offers abundant evidence for its intimate etiological relation to the disease. *C.* Experimental Studies: These experiments have shown that an organism identical with that isolated from typhus patients can be isolated from animals (guinea-pigs and monkeys) to which the disease has been transmitted by inoculation of typhus blood. The number of bacilli in the circulating blood is directly proportional to the severity of the disease and greatest at the height of the febrile reaction. The number per c.c. of blood, however, is always small. It has been possible, furthermore, to reproduce the disease in animals by injection of the organisms isolated from the blood of human cases. The organism can again be recovered from these animals at the height of the disease.

Complement-fixation in Pertussis.—Olnstead and Luttinger (*Arch. Int. Med.*, 16, No. 1, p. 67) report the results of complement-fixation tests in one hundred and eleven cases of pertussis or suspected pertussis. They give an excellent brief, review of the literature on this subject showing the marked discrepancies existing between the views of various workers, and offer as an explanation of these variable results certain minor differences in technique, such as methods of preparing antigen, amounts of antigen and serum used, etc. The primary objects if the investigation were to test the etiological relationship of the Bordet-Gengou bacillus and to determine the value of the complement-fixation test. About 40 per cent. of whooping-cough cases gave positive reactions with antigens of the Bordet-Gengou bacillus when inactivated serum was used. The highest percentage of positive reactions is given by convalescent vaccinated cases. A + + reaction by inactive serum with an antigen of the Bordet-Gengou bacillus is diagnostic of whooping-cough. Any reaction less strong is only suspicious, while a negative reaction has no significance. From these results the authors conclude that the Bordet-Gengou bacillus is probably the etiological factor in the disease.

The Concentration of the Protective Bodies in Antipneumococcus Serum. Specific Precipitate Extracts.—In connection with the finding of antisera for certain types of pneumococcus infection, Chickering (*Jour. Exper. Med.*, 1915, xxii, 248) has devised a method of concentrating the protective substances of the antiserum in a form containing but a relatively small amount of the serum proteins. The work is a direct sequence to a previous communication in which it was shown that the immune substances of an antipneumococcus serum may be removed by specific precipitation with extracts of the proper strain pneumococcus. These precipitates were found to be protective for animals against many times the lethal dose of pneumococci. In the present communication the author shows that extracts of these precipitates will not only inhibit the growth of virulent pneumococci *in vitro*, but will also protect experimental animals as efficiently as does the original antipneumococcus serum from which they are made. Furthermore, these extracts contain only a minimal amount of protein and are consequently much less apt to cause the disagreeable features of serum sickness so commonly 'seen in patients treated with the whole serum. Evidence is also offered that these precipitates and extracts may produce an active as well as a passive immunity to pneumococcus infections in mice.

The Treatment of High Blood-pressure.—Elliott (*Jour. Amer. Med. Assn.*, 1915, lxv, 999) believes that the most important measure in the management of high blood-pressure is the proper regulation of the personal habits and diet. He believes that vasodilator drugs serve a very useful purpose by modifying hypertension in the presence of certain complications, such as angina, apoplexy prodromes, stenocardia, and high tension headaches. Even as a routine they may occasionally prove of service, although in no instance should depressor effects be sought by the use of drugs alone. Much greater liberality in diet may be permitted non-nephritic cases than those of obviously nephritic type. Quantity is more important than quality in food selection. Provided renal function is well maintained, there appears no good reason why we should not permit a protein ration based on physiologic needs. The functional capacity of the kidney may be tested out with the phenolsulphonephthalein test. It has been asserted by Agnew, Folin and Denis and Seymour that, when the renal response to function testing falls to 40 per cent. or lower, waste nitrogen retention begins in the blood. Elliott reserves strict dietetic regulation for those cases showing a response of 40 per cent. or lower. In the routine observation of high blood-pressure, it will be found in the main that, for therapeutic purposes, the cases fall into two groups; those in which cardiac symptoms (dyspnea, angina, cardiac asthma, etc.) predominate, and those in which renal symptoms (polyuria, uremic manifestations, retinal developments, etc.) mark the case as plainly nephritic in type. The two groups require somewhat different handling. The renal type of case requires much stricter control of diet, greater care for elimination, and vigilant readiness to meet uremia emergencies. Uremia may develop as a steadily deepening chronic intoxication or as a sudden fulminating affair, appearing without warning or possibly precipitated by acute exacerbation of a more or less latent nephritis. Clinical observation alone may fail entirely to warn of the proximity of acute uremic developments. The greatest assistance may be derived from the routine employment of the phenolsulphonephthalein test. Cardiac failure may develop in either of two ways in arterial hypertension, that is, as left ventricular dilatation with falling systolic pressure and diminishing pulse pressure, or as a high pressure stasis with rising systolic pressure and pulse pressure maintained or increased. The former type is characterized by relative mitral insufficiency and broken systemic compensation with edema, the latter by splanchnic stasis, gallop rhythm, medullary dyspnea, often without edema and without heart murmurs. High pressure stasis calls for free hydragogue catharsis, perhaps bleeding, the type of left ventricular failure demands neither of these measures. They both require digitalis stimulation. The author emphasizes the point that digitalis is the most useful drug that we possess in high blood-pressure of whatsoever origin. It acts just as well and even better with a high pressure than with a falling pressure. Indeed, it will lower a rising pressure, and raise a falling pressure, provided cardiac embarrassment is the underlying cause. His experience leads him to urge that digitalis be employed early at the very appearance of cardiac decompensation, and it should be continued until thorough compensation has been reëstablished. If administration by mouth fails to secure the proper effect it should be employed intravenously. Strophanthin in sterile solution by intravenous administration is a highly efficient preparation in the heart failure of high blood-pressure. One-half cubic centimeter of 1 to 1000 solution of strophanthin injected into the elbow vein at appropriate intervals for several doses will often induce cardiac reaction when other measures fail. After the effects become apparent, digitalis may be substituted and the effect continued.

The Treatment of Nephritis.—PHIPPS (*Boston Med. and Surg. Jour.*, 1916, clxxiv, 73) says that during the past three months he has tried administering thyroid extract in the treatment of nephritis. Although his results were not uniform and although the study of the patients was necessarily incomplete in some instances, yet almost every case showed certain phenomena which were notable and at least suggestive of beneficial results of the medication. Phipps cites a few typical cases, and noted a particularly favorable effect upon edema. One case recovered from uremia, whereas he had been growing steadily worse and apparently was moribund until thyroid extract was added to his treatment. Cases of nephritis associated with hypertension were favorably influenced both as regards their hypertension and other symptoms of their disease. Phipps advises caution in administering thyroid extract and believes that if given carefully the administration of the drug is safe. He is of the opinion that thyroid medication should be given a more extended trial in nephritis.

The Allen Treatment of Diabetes.—BOOKMAN (*New York Med. Jour.*, 1915, cii, 1240) reports his experience in treating 24 cases of severe diabetes by the starvation method of Allen. His results agree with those of Allen and of others who have used this method. The patients rapidly become sugar free, and with few exceptions have improved in every way. The results in the juvenile cases have been most convincing. The author believes that in the management of severe diabetes the Allen method is a great step in advance, that it brings excellent results and brings them quickly. He finds this method perfectly feasible under the ordinary condition of private practice.